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(54) **SOFT MAGNETIC FILM AND THIN-FILM  
MAGNETIC HEAD, PLANAR MAGNETIC  
ELEMENT AND FILTER USING THE SOFT  
MAGNETIC FILM THEREOF**

of this, the resistivity is made very high, and the  
frequency characteristic is made superior.

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(57) Abstract:

PROBLEM TO BE SOLVED: To realize a constant high resistivity and a superior performance at high-frequency band by mixing microcrystal phase, wherein Co and an element T are main bodies, into amorphous phase containing the large amount of the oxide film of an element M and further containing the oxide of the element M in a microcrystalline phase.

SOLUTION: A soft magnetic film mainly includes Co as the main component, an element T containing at least one of Fe and Ni, one kind or two or more kinds of elements M, which are selected from among Ti, Zr, Hf and the like and rare-earth elements and O. In the film structure, the microcrystalline phase, wherein Co and the element T are the main components, is mixed in the amorphous phase including the large amount of the oxide of the element M. Furthermore, in this microcrystalline phase, the oxide of the element M is contained. By using this soft magnetic film, at least one of either a lower core layer 1 or an upper core layer 6 is formed. As a result

